Physico-chemicals and catalytic properties of manganese-promoted vanadium phosphate (VPO) catalyst

Abstract

The addition of 1% Mn promoter to vanadium phosphate catalyst led to doubling of the specific surface area from 20.3 (unpromoted) to 39.4 m2 g−1. The XRD pattern of the Mn-promoted catalyst gave only the characteristics of the (VO)2P2O7 phase, indicating that the Mn was incorporated into the crystal lattice of the catalyst. The Mn-promoted catalyst was also twice as active in removing the total amount of oxygen. However, since the only oxygen species related to V4+ being removed and no oxygen species associated with V5+ was observed, the n-butane conversion was not much improved as compared to the unpromoted counterpart. A necessary amount and distribution of the V5+ phase in a well crystalline V4+ phase is essential in order to enhance the catalytic performance in the mild oxidation of n-butane to maleic anhydride.

Keyword: Vanadium phosphate, Mn, butane oxidation, maleic anhydride